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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/756,936	01/13/2004	Shaoher X. Pan	021713-002211US	3300

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EXAMINER	
ROBINSON, MARK A	

ART UNIT	PAPER NUMBER
2872	

DATE MAILED: 12/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/756,936	PAN ET AL.	
	Examiner	Art Unit	
	Mark A. Robinson	2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-20 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-20 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4/15/05.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant is advised that the Notice of Allowance mailed 3/1/05 and 8/5/05 is vacated. If the issue fee has already been paid, applicant may request a refund or request that the fee be credited to a deposit account. However, applicant may wait until the application is either found allowable or held abandoned. If allowed, upon receipt of a new Notice of Allowance, applicant may request that the previously submitted issue fee be applied. If abandoned, applicant may request refund or credit to a specified Deposit Account.

Claim Objections

2. Claim 14 is objected to because of the following informalities: "the plurality of electrodes" in lines 2-3 lacks antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Petersen (US 4317611).

Regarding claims 1 and 2, Petersen shows a micromirror including a mirror plate(30), spacer support frame(10) and a hinge(22,24) connecting the mirror plate and the support frame allowing the mirror to rotate about an axis defined by the hinge, wherein each of these elements are made from a single continuous piece of crystal silicon material (see the abstract, col. 3 line 13, etc.).

Regarding claim 3, Petersen further shows the hinge to be a torsion spring. Note that this spring may be considered as "vertically oriented" since it includes a vertical dimension and/or it may be oriented "vertically."

Regarding claims 4 and 5, Petersen teaches the mirror plate to include a reflective top surface or a reflective layer on top of the plate (col. 3 lines 15-18).

5. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Polinsky (US 6782153).

Regarding claims 1 and 2, Polinsky shows a micromirror (figs. 5,7) including a mirror plate(300), spacer support frame(400,312) and a hinge(302,310) connecting the mirror plate and the support frame allowing the mirror to rotate about an axis defined by the hinge, wherein each of these elements are made from a single continuous piece of crystal silicon material (see col. 8 line 8).

Regarding claim 3, Polinsky further shows the hinge to be a torsion spring. Note that this spring may be considered as "vertically oriented" since it includes a vertical dimension and/or it may be oriented "vertically" (e.g. fig. 6).

Regarding claims 4 and 5, Polinsky teaches the mirror plate to include a reflective top surface or a reflective layer on top of the plate (e.g. col. 8 lines 45-48).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at

> the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen.

Petersen does not teach the specific thickness for the walls of the support frame. However, it would have been obvious to the ordinarily skilled artisan at the time of invention to make Petersen's support frame walls with this thickness since it has been held that where the general conditions of the claim are disclosed, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Specifying or adjusting the thickness of the walls would be performed in adapting Petersen's device for its various deflecting applications.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Polinsky.

Polinsky does not teach the specific thickness for the walls of the support frame. However, it would have been obvious to the ordinarily skilled artisan at the time of invention to make Polinsky's support frame walls with this thickness since it has been held that where the general conditions of the claim are disclosed, discovering the optimum or workable ranges involves

only routine skill in the art. *In re Aller*, 105 USPQ 233. Specifying or adjusting the thickness of the walls would be performed in adapting Polinsky's device for its various deflecting applications.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen in view of Drake (US 6128122).

Petersen does not show a mechanical stop for limiting rotation of the mirror plate. However, such is taught by Drake (note item 50). It would have been obvious to the ordinarily skilled artisan at the time of invention to include this structure of Drake with Petersen's device in order to provide protection against over-rotation of the mirror, thus preventing damage to the device as taught by Drake.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Polinsky in view of Drake.

Polinsky does not show a mechanical stop for limiting rotation of the mirror plate. However, such is taught by Drake (note item 50). It would have been obvious to the ordinarily skilled artisan at the time of invention to include this structure of Drake with Polinsky's device in order to provide

protection against over-rotation of the mirror, thus preventing damage to the device as taught by Drake.

11. Claims 8-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Petersen in view of Hornbeck (US 5535047).

Petersen discloses the limitations of the micro mirror of claims 8,9,11 and 17 as discussed above, but does not teach an array of such micro mirrors or a spatial light modulator having such an array. However, Hornbeck shows a spatial light modulator having an array of micro mirrors (e.g. fig. 4). Note with respect to claims 15 and 16 that Hornbeck's mirrors appear to make up at least 90% of the array surface area (shown in fig. 4). It would have been obvious to the ordinarily skilled artisan at the time of invention to make an array of Petersen's mirrors (i.e. a plurality of mirrors) in order to enable spatial light modulation as taught by Hornbeck.

Regarding claim 10, although not taught by the references, mirror plates having polished surfaces are very common and well known in the art. It would have been obvious to the ordinarily skilled artisan at the time of invention to use a polished mirror surface in order to reduce the number of parts or simplify the construction of the mirror (i.e. using a polished reflective surface instead of adding a reflective layer).

Regarding claim 12, Petersen further shows a control substrate(10) having an electrode to controllably deflect the mirror plate.

Regarding claim 13, Petersen's hinge divides the mirror plate into halves which rotate about the hinge axis (see figs. 1 and 3).

Regarding claim 14, Petersen does not teach control circuitry for controlling the electrodes to deflect the mirrors. However, Hornbeck teaches circuitry for controlling the array of mirrors in this manner (col. 1 line 39). It would have been obvious to the ordinarily skilled artisan at the time of invention to include Hornbeck's circuitry (along with the additional mirrors) with Petersen's device in order to enable control of the array of mirrors.

Regarding claim 19, note that the mirror plates are shown to be rectangular.

Regarding claims 18 and 20, the references do not teach the specific values for the gap between the mirror plates and support walls nor the surface area of the mirror plates. However, it would have been obvious to the ordinarily skilled artisan at the time of invention to make Petersen's gap between the support frame walls and the mirror plate with the claimed value and to make the surface area of the mirrors of Petersen in

view of Hornbeck with the claimed value since it has been held that where the general conditions of the claim are disclosed, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Specifying or adjusting the gap and mirror surface area would be performed in adapting the device of Petersen in view of Hornbeck for its various deflecting or spatial modulation applications.

12. Claims 8-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Polinsky in view of Hornbeck.

Polinsky discloses the limitations of the micro mirror of claims 8,9,11 and 17 as discussed above, but does not show an array of such micro mirrors or a spatial light modulator having such an array. However, Hornbeck shows a spatial light modulator having an array of micro mirrors (e.g. fig. 4). Note with respect to claims 15 and 16 that Hornbeck's mirrors appear to make up at least 90% of the array surface area (shown in fig. 4). It would have been obvious to the ordinarily skilled artisan at the time of invention to make an array of Polinsky's mirrors (i.e. a plurality of mirrors) in order to enable spatial light modulation as taught by Hornbeck.

Regarding claim 10, although not taught by the references, mirror plates having polished surfaces are very common and well

known in the art. It would have been obvious to the ordinarily skilled artisan at the time of invention to use a polished mirror surface in order to reduce the number of parts or simplify the construction of the mirror (i.e. using a polished reflective surface instead of adding a reflective layer).

Regarding claim 12, Polinsky further shows a control substrate (figs. 8-9) having an electrode to controllably deflect the mirror plate.

Regarding claim 13, Polinsky's hinge divides the mirror plate into halves which rotate about the hinge axis (fig. 5).

Regarding claim 14, Polinsky does not teach control circuitry for controlling the electrodes to deflect the mirrors. However, Hornbeck teaches circuitry for controlling the array of mirrors in this manner (col. 1 line 39). It would have been obvious to the ordinarily skilled artisan at the time of invention to include Hornbeck's circuitry (along with the additional mirrors) with Polinsky's device in order to enable control of the array of mirrors.

Regarding claim 19, note that the mirror plates are shown to be rectangular.

Regarding claims 18 and 20, the references do not teach the specific values for the gap between the mirror plates and support walls nor the surface area of the mirror plates.

However, it would have been obvious to the ordinarily skilled artisan at the time of invention to make Polinsky's gap between the support frame walls and the mirror plate with the claimed value and to make the surface area of the mirrors of Polinsky in view of Hornbeck with the claimed value since it has been held that where the general conditions of the claim are disclosed, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. Specifying or adjusting the gap and mirror surface area would be performed in adapting the device of Polinsky in view of Hornbeck for its various deflecting or spatial modulation applications.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Robinson whose telephone number is (571) 272-2319.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn, can be reached at (571) 272-2312. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MR
12/9/05

MARK A. ROBINSON
PRIMARY EXAMINER